IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Patent Application of	:	
Kenneth A. Windhorst et al.	:	
U.S. Serial No. 10/635,983	:	Examiner: K.J. Puttlitz
Filed August 7, 2003	:	Group Art Unit: 1621
Docket No. C-7220 (CEL-06-7)	:	
For: PROCESS FOR PREPARING ORGANIC COMPOUNDS HAVING IMPROVED COLOR CHARACTERISTICS	:	

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

BRIEF ON APPEAL UNDER 37 CFR §41.37(c)

Sir:

Applicant hereby submits its *Brief on Appeal* in the above-noted patent application. A *Notice of Appeal* was filed on January 29, 2007, appealing the *Final Rejection* of November 28, 2006. Please charge the fee for this *Brief on Appeal* to our Deposit Account No. 50-0935.

This *Brief on Appeal* is being filed with a *Petition* and fee for a two-month *Extension of Time*. If any additional fees are due or an additional *Extension of Time* is required, please consider this paper a petition therefor and charge fees related to this *Brief on Appeal* to our Deposit Account No. 50-0935.

I. REAL PARTY IN INTEREST

The real party in interest in this case is Celanese International Corporation, Assignee of Record.

The *Assignment* recordation to International Corporation is dated August 7, 2003, Reel/frame 014385/0537.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals, interferences or judicial proceedings related to, or which will affect, or which will be affected by, or which will have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 1-9 and 14-20 stand finally rejected and are on appeal. A complete listing of claims on appeal is provided in Appendix VIII.

IV. STATUS OF AMENDMENTS

No *Amendments* have been filed subsequent to the *Final Rejection* of November 28, 2006.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention is directed to a method of stabilizing the color of commodity chemicals, such as butyric acid, by adding small amounts of water. Quite remarkably, the addition of 100 ppm – 50,000 ppm water to previously purified organic compounds greatly reduces the formation of color bodies. This is an unexpected result, not suggested in the art. Details as to the claimed subject matter appear in the following table.

Claim Summary Mapping Independent Claims to Specification

Claim 1 1. A process for preparation of a color stable organic compound/water mixture from an organic compound selected from the group consisting of C_1 to C_6 carboxylic acids, ketones having boiling points from 154°C to 170°C, and esters having boiling points from about 168°C to about 250°C, the process comprising combining the organic compound with water under conditions of agitation to form a mixed solution of the organic compound and water having a consistent concentration of water comprising from about 100 ppm to about 50,000 ppm water to produce the color stable organic compound/water mixture, wherein the color stable organic compound/water mixture has an APHA color value of 15 or less after being boiled for at least one hour at one atmosphere of pressure.	The subject matter of Claim 1 is described generally in the abstract. Details of the color stable organic compound/water mixture are found on page 2 lines 19-22 and page 5 lines 3-11. Details of the organic compound selected from the group consisting of C_1 to C_6 carboxylic acids, ketones having boiling points from 154°C to 170°C, and esters having boiling points from about 168°C to about 250°C are found on page 2 lines 29-31 and page 6 lines 4-7. Details of the combination of the organic compound with water having a consistent concentration of water comprising from about 100 ppm to about 50,000 ppm water are found on page 2 lines 6-8, page 5 lines 23-33, and page 6 lines 1-7. Details of the production of the color stable organic compound/water mixture, wherein the color stable organic compound/water mixture has an APHA color value of 15 or less after being boiled for at least one hour at one atmosphere of pressure are found on page 2 lines 19-22, page 5 lines 3-22, and page 6 lines 24-30 (All references are to the specification as filed.)

Claim Summary Mapping Independent Claims to Specification (cont'd)

Claim 14 A process for preparation of a color stable organic compound/water mixture, wherein the organic compound is selected from the group consisting of C_1 to C_6 carboxylic acids, ketones having boiling points from 154°C to 170°C, and esters having boiling points from about 168°C to about 250°C, the process comprising: (a) removing a crude product stream comprising the organic compound from a reaction zone in which the organic compound is prepared; (b) introducing the crude product stream into a distillation column having a lower portion and an upper portion wherein the upper portion and the lower portion are maintained at a temperature of about 23°C to about 250°C and at a pressure of about 10.1 kPa to about 202.6 kPa; (c) removing the organic compound as a side-stream from the distillation column to produce a finished organic compound; and (d) combining the finished organic compound with water under conditions of agitation to form a mixed solution of the organic compound and water having a consistent concentration of water comprising from about 100 ppm to about 50,000 ppm water to produce the color stable organic compound product, wherein the color stable organic compound/water mixture has an APHA color value of 15 or less after being boiled for at least one hour at one atmosphere of pressure.	The subject matter of Claim 14 is described generally in the abstract. Details of the color stable organic compound/water mixture are found on page 2 lines 19-22 and page 5 lines 3-11. Details of the organic compound selected from the group consisting of C_1 to C_6 carboxylic acids, ketones having boiling points from 154°C to 170°C, and esters having boiling points from about 168°C to about 250°C are found on page 2 lines 29-31 and page 6 lines 4-7. Details of the removal of a crude product stream are found on Page 4 lines 3-7. Details of introducing the crude product stream into a distillation column having a lower portion and an upper portion wherein the upper portion and the lower portion are maintained at a temperature of about 23°C to about 250°C and at a pressure of about 10.1 kPa to about 202.6 kPa are found on page 2 lines 8-14 and page 8 lines 4-18. Details of removing the organic compound as a side-stream from the distillation column to produce a finished organic compound can be found in page 4 line 9-33 continued on to page 5 lines 1 and 2. Details of the combination of the organic compound with water having a consistent concentration of water comprising from about 100 ppm to about 50,000 ppm water are found on page 2 lines 6-8, page 5 lines 23-33, and page 6 lines 1-7. Details of the production of the color stable organic compound/water mixture, wherein the color stable organic compound/water mixture has an APHA color value of 15 or less after being boiled for at least one hour at one atmosphere of pressure are found on page 2 lines 19-22, page 5 lines 3-22, and page 6 lines 24-30 (All references are to the specification as filed.)

ADDITIONAL EVIDENCE SUBMITTED BEARING UPON PATENTABILITY

A *Declaration Under 37 CFR §132* of *Kenneth Allen Windhorst* submitted in this case and entered into the record on or about August 14, 2006. A copy is attached in Appendix IX.

The August, 2006 *Declaration*, paragraph 4, points out unexpected, superior results seen with the invention:

> 4. The Subject Invention resides, in part, in the discovery that adding water to a finished organic compound can greatly enhance APHA color characteristics. This discovery was unexpected and is very useful since superior color is achieved without expensive additional processing steps. Examples 5-7 of the above-noted application as filed are illustrative:
>
> Examples 5-7
> The effect of color improvement though the addition of water was determined on three samples from a commercially produced butyric acid run. The samples were prepared by successive distillations of the same portion of the commercially produced butyric acid run. The APHA colors of the samples were determined to be as follows:
>
> Example 5 13
> Example 6 3
> Example 7 1
>
> The color variance of the samples is attributable to the fact that more color bodies were present in the first distillation sample as compared to the second and third distillation samples.
> To each of these samples was added 20,000 ppm, water while stirring at room temperature, to ensure uniform distribution of the water. Following addition of the water, the APHA colors of the samples were determined as follows:
>
> Example 5 1
> Example 6 1
> Example 7 1

The grounds of rejection to be reviewed on appeal are set forth immediately below.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

In the *Final Rejection* of November 28, 2006, all claims were rejected as anticipated by or obvious over United States Patent No. 3,214,347 to *Grekel et al.* The Examiner Noted:

> Claims 1-9 and 14-20 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over (U.S. Patent No. 3,214,347 to Grekel et al. (Grekel).
>
> Grekel teaches a singular embodiment in Example 1 wherein an aqueous mixture of crude acids containing isobutyric acid and n-butyric acid is subjected to distillation in a conventional fractionation column. The temperature employed at the bottom of the column is about 175 C. (440 mm.) and the top tower temperature is about 132 C. (300 mm.). From the base of the column a stream is removed that contains approximately 2 percent of the n-butyric acid present in the original feed. A second column containing only water is then started up under total reflux, after which the aforesaid distillate is used as feed. Water is removed from the column under refluxing conditions. Distillate is brought overhead and allowed to stratify into an upper organic layer that contains 4 percent of the n-butyric acid present in the aforesaid original feed. The n-butyric acid is then further purified by distillation to a APHA color value of 5. See description bridging columns 1 and 2.

The rejections should be withdrawn for the reasons discussed below and all rejected claims allowed.

VII. ARGUMENT

The present invention is directed to a method of stabilizing the color of an organic compound involving adding water to an compound so that the mixture has water at a concentration of 100 ppm to 50,000 ppm to provide color stability to a product. The color stable organic compound/water mixture has an APHA color value of 15 or less following heat treatment involving boiling the product stream for an average residence time of one hour at atmospheric pressure.

Claim 1 is representative:

> 1. A process for preparation of a color stable organic compound/water mixture from an organic compound selected from the group consisting of C_1 to C_6 carboxylic acids, ketones having boiling points from 154°C to 170°C, and esters having boiling points from about 168°C to about 250°C, the process

comprising combining the organic compound with water under conditions of agitation to form a mixed solution of the organic compound and water having a consistent concentration of water comprising from about 100 ppm to about 50,000 ppm water to produce the color stable organic compound/water mixture, wherein the color stable organic compound/water mixture has an APHA color value of 15 or less after being boiled for at least one hour at one atmosphere of pressure.

It is appreciated from the foregoing that the claimed subject matter requires (1) a consistent, that is uniform and unchanging, concentration of water (2) that water is added in the process such that the mixture contains 100 ppm to 50,000 ppm water and (3) that the mixture is color stable having a color value of 15 or less after boiling for one hour. This latter feature is seen in the specification, Example 1, ¶22:

Example 1

[0022] A commercially produced butyric acid was found to have an APHA color value of 4. A first sample of the butyric acid was boiled for one hour and found to have an APHA color of 31 after boiling. Water was added to a second sample of the same commercially produced batch of butyric acid, while stirring at room temperature, until a concentration level of 1000 ppm water was reached. The water containing second sample was then boiled for one hour in the same manner as the first sample. Following boiling, the APHA color value of the second sample was determined to be 12.

The '347 *Grekel et al.* patent does not disclose, teach or suggest the claimed invention. The reference teaches to remove water during purification, unlike the invention which uses water to promote color stability.

A. Claims 1-9 and 14-20 are patentable over United States Patent No. 3,214,347 to *Grekel et al.*

Grekel at al. '347 relates to azeotropic purification of butyric acid. Water is used in intermediate purification to azeotrope impurities; however, water is not added to the product as is claimed in this case. *Grekel et al.* say so at Col. 2, lines 14-20:

> It is another object of our invention to provide a process for the purification of the aforesaid acids by means of azeotropically distilling out the impurities therein in the presence of water wherein very little --- if any process water need be added during the operation after steady-state conditions have been established in the system.

They also say so at Col. 2, lines 54-63:

> The point in the column at which the make-up water is added is immaterial as long as it is not introduced at a level so low in the column that it will interfere with the production of substantially dry acid at the base of the column.
> By admitting water to the column and operating initially under total reflux, as described above, the use of additional process water can be virtually eliminated even if the feed employed is absolutely dry.

Grekel et al. '347 also teach to eliminate water by boiling the crude product of Example 1 in a **third** column **and** a fourth column. *See* Example 1, Col. 7, line 69 – Col. 8, line 20.

Grekel et al.'347 also report in Examples A and B that water is **removed** from the feed. *See* Table at Col. 9, reproduced below:

TABLE

Operating Conditions—Rates—Grams per Hour	Run A			Run B		
Feed	323.2			352.9		
Distillate Product—Withdrawn:						
Organic Layer	26.7			21.6		
Water Layer	0			46.4		
Bottoms	308.8			306.3		
Reflux (including internal reflux)	222.5			197.4		
	Butyric Acid	Non-acids	Water	Butyric Acid	Non-acids	Water
COMPOSITION, WT. PERCENT						
Feed	95.0	4.5	0.5	84.3	4.0	11.7
Distillate Organic Layer	41.4	53.1	5.5	48.5	44.8	6.7
Distillate Water Layer				9.5	2.4	88.1
Reflux	All of water layer			9.5	2.4	88.1
Bottoms	99.2	0.5	0.25	97.4	2.5	0.11
Plate 30 liquid	58.9	2.1	[1] 39.0			[1] 1.3
COLUMN CONDITIONS						
Barometric Pressure (top column), mm. Hg	741.4			754.6		
Temperature, ° C.:						
Plate 55 vapor	99.0			99.5		
Plate 40 (feed point vapor)	99.0			99.5		
Plate 30 vapor [2]	98.5			158.0		
Pot vapor	156.0			164.0		
Pot liquid	163.5			166.5		
MATERIAL BALANCES						
Acid as butyric	104			98		
Nonacids by difference	109			126		
Water	139			103		
Distribution of pure n-butyric acid, percent in bottoms	97			95		

[1] In Run A corresponds to 76.0 mol percent and in Run B corresponds to 6.0 mol percent.
[2] Tenth plate below the feed plate.

It is seen in the foregoing Table that in Run A, the feed has 0.5% water, while the bottoms (product) has 0.25% water. In Run B, the feed has 11.7% water and the bottoms (product) has 0.11% water. ***Water has not been added—it has been removed.***

Grekel et al. '347 does not disclose a concentration range of 100 ppm to 50,000 ppm on the plates as contended by the Examiner. Figure 2 of the '347 patent discloses 0 to about 100 mole % water:

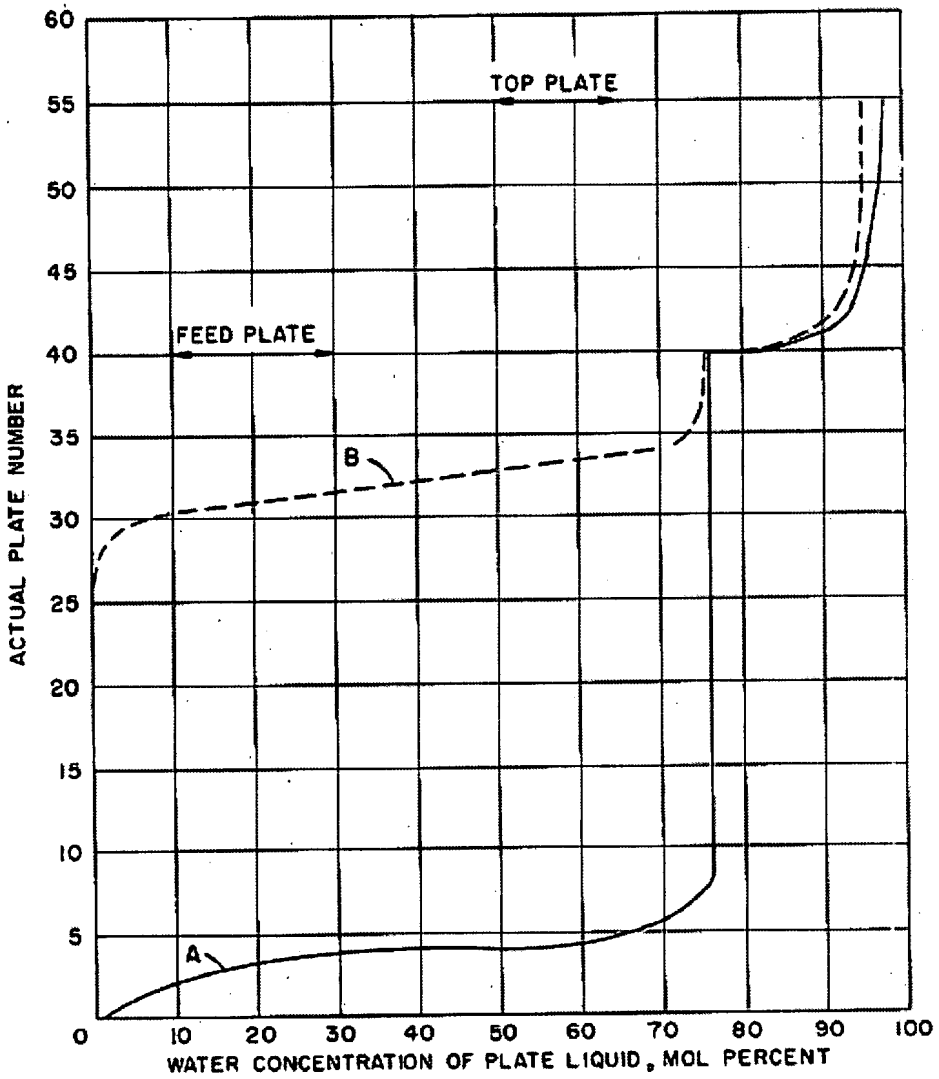


FIG. 2

The Examiner's contention that a concentration of 100 ppm to 50,000 ppm added water is disclosed is hindsight.

As to the Examiner's observation that *Grekel et al.* '347 teaches a color value of 5 in Col. 8, line 13, it is noted that the "5" was achieved after a **third** and **fourth** distillation. This is precisely the extra process steps avoided by way of the present invention. See the specification, paragraph 16:

> **[0016]** To provide a product having desirable low color values, it may be necessary to undertake expensive and time consuming additional purification steps to produce a low APHA color value products. It has been unexpectedly determined that stable low APHA color value carboxylic acid, ketone, and glycol ester products may be consistently produced without the need for additional expensive and time consuming purification steps. The low color value products may be produced through each of the two different processes described in this disclosure and through the use of a combination of the two processes.

Moreover, there is no teaching whatsoever that the finished product of Col. 8 of '347 *Grekel et al.* is color stable to boiling for 1 hour nor is there any disclosure as to water content of that product. After two additional boilings at over 150°C, it is unlikely any water at all is present. The rejections are thus merely speculative and should be withdrawn.

The '347 *Grekel et al.* reference does not support a §102 rejection.

MPEP § 2131 states that to anticipate a claim, a reference must teach every element of the claim. MPEP § 2131:

> A claim is anticipated only if **each and every element** as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "When a claim covers several structures or compositions, either generically or as alternatives, the claim is deemed anticipated if any of the structures or compositions within the scope of the claim is known in the prior art." *Brown v. 3M*, 265 F.3d 1349, 1351, 60 USPQ2d 1375, 1376 (Fed. Cir. 2001) (claim to a system for setting a computer clock to an offset time to address the Year 2000 (Y2K) problem, applicable to records with year date data in "at least one of two-digit, three-digit, or four-digit" representations, was held anticipated by a system that offsets year dates in only two-digit formats). See also MPEP § 2131.02. "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as

> required by the claim, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

MPEP §2112, part (IV), specifically prohibits making speculative rejections as the Examiner has done:

> The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' " *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted) (The claims were drawn to a disposable diaper having three fastening elements. The reference disclosed two fastening elements that could perform the same function as the three fastening elements in the claims. The court construed the claims to require three separate elements and held that the reference did not disclose a separate third fastening element, either expressly or inherently.).

The alternative obviousness rejections are also improper because the *Grekel et al.* '347 patent does not teach **each and every** element in the applicant's invention (see MPEP § 2143.03 reproduced in part below).

> To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

It is further noted that unrecognized properties of materials in the prior art are not teachings which make a later discovery obvious. In this regard, *note, Van Veen* v. *United States*, 156 USPQ 403, 405-406 (Ct. Cl. 1967):

> It is incorrect to hold that an invention was obvious when made, simply because the invention is simple in nature and is easily understood when described in a patent specification. Experience has shown that some of the simplest advances have been the most nonobvious. The prior art, in addition to the Daiber '380 patent mentioned above, cited by the defendant, provides a prior art base which renders the distinctions between the prior art and the subject invention even more significant. None of the prior art cited by defendant copes with the problem of heat loss through the peripheral seams of the sleeping bag.
>
> Defendant says that under the rule of General Electric Co. v. Jewel Incandescent Lamp Co., 326 U.S. 242, 247-49, 67 USPQ 155, 157-158 (1945), it is of no moment that the prior art (particularly MIL-B-830) failed to recognize that seams of this type would prevent or diminish heat loss. 1 But the Supreme Court has also indicated that "accidental results, not intended and not appreciated, do not constitute anticipation." Eibel Process Co. v. Minnesota & Ontario Paper Co., 261 U.S. 45, 66 (1923); See also Tilghman v. Proctor, 102 U.S. 707, 711 (1880). In the General Electric case, the court found that the new use, advantage, or quality was apparent in view of the prior art (see 326 U.S. at 248, 67 USPQ at 157). **In the present case, it was not obvious to convert the special 30-inch seam of the Military Specification, even though it happened to be insulated, into the overall peripheral sleeping bag seams of the plaintiff's patent. In that respect the unrecognized quality (i.e., heat-loss prevention) inhering in the short seam of the Military Specification was merely "accidental" and no bar."** (Noting the fact that formulations may have had unrecognized properties is an improper basis to reject claims for obviousness.)

All rejections should be withdrawn.

B. Unexpected, Superior Results Warrant Allowance of this Case

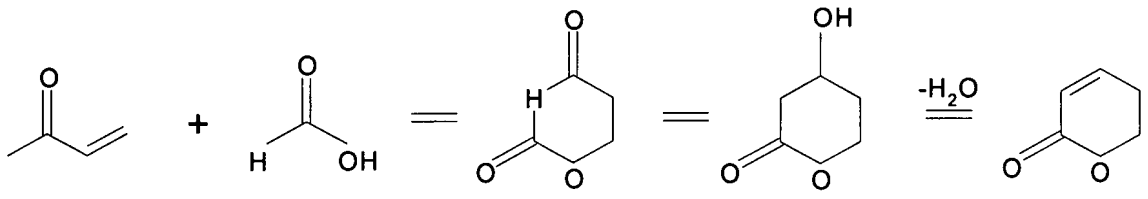
As is stated by Kenneth Windhorst in the August *Declaration Under 37 CFR § 132*, it is an unexpected and very useful superior result that commercial products' color can be stabilized and enhanced simply by adding relatively low levels of water. Moreover, the results are unexpected and dramatic. *See* Examples 5-7, line 17+ of the application as filed and paragraph 4 of the August *Declaration* (reproduced below):

4. The Subject Invention resides, in part, in the discovery that adding water to a finished organic compound can greatly enhance APHA color characteristics. This discovery was unexpected and is very useful since superior color is achieved without expensive additional processing steps. Examples 5-7 of the above-noted application as filed are illustrative:

> Examples 5-7
>
> The effect of color improvement though the addition of water was determined on three samples from a commercially produced butyric acid run. The samples were prepared by successive distillations of the same portion of the commercially produced butyric acid run. The APHA colors of the samples were determined to be as follows:
>
> Example 5 13
> Example 6 3
> Example 7 1
>
> The color variance of the samples is attributable to the fact that more color bodies were present in the first distillation sample as compared to the second and third distillation samples.
>
> To each of these samples was added 20,000 ppm, water while stirring at room temperature, to ensure uniform distribution of the water. Following addition of the water, the APHA colors of the samples were determined as follows:
>
> Example 5 1
> Example 6 1
> Example 7 1

Without intending to be bound by theory, it is believed that the addition of water prevents the formation of color bodies by dehydration. *Note* page 9 of the application as filed, line 3 and following from paragraph 5 from the August *Declaration*:

> 5. ...It is believed that a compound formed from an unsaturated ketone and a carboxylic acid in the production of the relevant organic compounds leads to formation of a Michael Adduct in accordance with the following reaction process:



Unsaturate Carboxylic acid Michael Adduct Color body

As seen from this reaction process, the Michael adduct, upon dehydration, yields color bodies thought to lead to the undesirable darker color products. It is believed that by adding water to the organic compound products, formation of the color bodies is prevented.

The rejections should be withdrawn in light of the evidence. *In re Soni* is *apropos* (34 USPQ2d 1684, 1687 and following (CAFC 1995):

> Mere improvement in properties does not always suffice to show unexpected results. In our view, however, when an applicant demonstrates substantially improved results, as Soni did here, and states that the results were unexpected, this should suffice to establish unexpected results in the absence of evidence to the contrary. Soni, who owed the PTO a duty of candor, made such a showing here. The PTO has not provided any persuasive basis to question Soni's comparative data and assertion that the demonstrated results were unexpected. Thus, we are persuaded that the Board's finding that Soni did not establish unexpected results is clearly erroneous.
> The cases cited by the dissent are not to the contrary. Neither De Blauwe, nor Wood, nor Lindner requires a showing of unexpectedness separate from a showing of significant differences in result. Nor does Merck, which involved compositions understood to differ only in "a matter of degree." Those are not the facts here, where substantially improved properties were shown. Given a presumption of similar properties for similar compositions, substantially improved properties are ipso facto unexpected. The difficulty postulated by the dissent in distinguishing substantial from insubstantial improvement is no greater than the PTO and the courts have encountered, successfully, for many years in making judgments on the question of obviousness. It is not unworkable; it is simply the stuff of adjudication. Nor does it change established burdens of proof. The PTO here established a prima facie case, the applicant responded to it with a showing of data, and the PTO made an inadequate challenge to the adequacy of that showing.

C. Claim 8 is Patentable for the Additional Reason that Low Temperature Mixing is Not Even Remotely Suggested by *Grekel et al.* '347

Claim 8 reads as follows:

> 8. The process of Claim 7 wherein the water and organic compound are combined at a temperature of about 20° C to about 50° C.

Grekel et al. '347 relates to distillation at elevated temperature. The low temperature mixing process of Claim 8 is not even remotely suggested. Accordingly, Claim 8 is patentable for the reasons discussed earlier and for his additional reason.

D. Claims 14-20 are Patentable for the Additional Reason that These Claims Require Removal from the Distillation Column

Claim 14 reads as follows:

> 14. A process for preparation of a color stable organic compound/water mixture, wherein the organic compound is selected from the group consisting of C_1 to C_6 carboxylic acids, ketones having boiling points from 154°C to 170°C, and esters having boiling points from about 168°C to about 250°C, the process comprising:
>
> (a) removing a crude product stream comprising the organic compound from a reaction zone in which the organic compound is prepared;
>
> (b) introducing the crude product stream into a distillation column having a lower portion and an upper portion wherein the upper portion and the lower portion are maintained at a temperature of about 23°C to about 250°C and at a pressure of about 10.1 kPa to about 202.6 kPa;
>
> (c) removing the organic compound as a side-stream from the distillation column to produce a finished organic compound; and
>
> (d) combining the finished organic compound with water under conditions of agitation to form a mixed solution of the organic compound and water having a consistent concentration of water

> comprising from about 100 ppm to about 50,000 ppm water to produce the color stable organic compound product, wherein the color stable organic compound/water mixture has an APHA color value of 15 or less after being boiled for at least one hour at one atmosphere of pressure.

The *Grekel et al.* '347 patent does not disclose, teach or suggest removing the organic compound from the distillation column and combining the finished organic compound with water resulting in a color stable organic compound water mixture of 100 ppm to about 50,000 ppm water and an APHA color value of 15 or less after being boiled for at least one hour at one atmosphere of pressure.

Furthermore, the *Grekel et al.* '347 process would be ineffective to produce the applicant's claimed results (precluded by the nonacid impurities). See *Declaration Under 37 CFR §132* of *Kenneth Allen Windhorst*, ¶3, last 2 sentences:

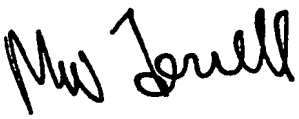
> I further note that the impurities that are believed to cause color do not azeotrope with water, and the process of '347 patent would be ineffective to remove them in any case. The actual production processes involved in producing butyric acid and other organic compounds typically use water and other additives in the process which are ineffective to remove color causing impurities in the finished product; which is why the Subject Invention adds water after the production is complete.

Claim 14 and its dependent Claims 15-20 are patentable for the reasons discussed earlier in this *Brief on Appeal* and for the additional reasons stated in this section.

CONCLUSION

For the above reasons, all outstanding rejections should be withdrawn and all claims passed to issue. *Grekel et al.* '347 teaches to remove water, not add it to form a mixed solution of an organic compound with water as is claimed; the reference does not anticipate nor obviate the claimed subject matter. Moreover, unexpected and superior results have been demonstrated, warranting allowance of this case.

Respectfully submitted,



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May 18, 2007

VIII. CLAIMS APPENDIX

CLAIMS ON APPEAL

1. (Previously presented) A process for preparation of a color stable organic compound/water mixture from an organic compound selected from the group consisting of C_1 to C_6 carboxylic acids, ketones having boiling points from 154°C to 170°C, and esters having boiling points from about 168°C to about 250°C, the process comprising combining the organic compound with water under conditions of agitation to form a mixed solution of the organic compound and water having a consistent concentration of water comprising from about 100 ppm to about 50,000 ppm water to produce the color stable organic compound/water mixture, wherein the color stable organic compound/water mixture has an APHA color value of 15 or less after being boiled for at least one hour at one atmosphere of pressure.

2. (Previously presented) The process of claim 1 wherein the water and the organic compound are combined to produce the color stable organic compound/water mixture at a temperature of about 0°C to about 160°C.

3. (Previously presented) The process of claim 2 wherein the conditions of agitation include stirring.

4. (Previously presented) The process of claim 3 wherein the color stable organic compound/water mixture has an APHA color value of 12 or less after being boiled for at least one hour at one atmosphere of pressure.

5. (Previously presented) The process of claim 4 wherein the organic compound is a C_1 to C_6 carboxylic acid.

6. (Previously presented) The process of claim 5 wherein the organic compound is butyric acid.

7. (Previously presented) The process of claim 6 wherein the color stable organic compound/water mixture comprises from 100 ppm to about 10,000 ppm water.

8. (Previously presented) The process of claim 7 wherein the water and the organic compound are combined to produce the color stable organic compound/water mixture product at a temperature of about 20°C to about 50°C.

9. ((Previously presented) The process of claim 8 wherein the color stable organic compound/water mixture comprises from 500 ppm to about 1,000 ppm water.

Claims 10-13 (Cancelled)

14. (Previously presented) A process for preparation of a color stable organic compound/water mixture, wherein the organic compound is selected from the group consisting of C_1 to C_6 carboxylic acids, ketones having boiling points from 154°C to 170°C, and esters having boiling points from about 168°C to about 250°C, the process comprising:

    (a) removing a crude product stream comprising the organic compound from a reaction zone in which the organic compound is prepared;

    (b) introducing the crude product stream into a distillation column having a lower portion and an upper portion wherein the upper portion and the lower portion are maintained at a temperature of about 23°C to about 250°C and at a pressure of about 10.1 kPa to about 202.6 kPa;

    (c) removing the organic compound as a side-stream from the distillation column to produce a finished organic compound; and

    (d) combining the finished organic compound with water under conditions of agitation to form a mixed solution of the organic compound and water having a consistent concentration of water comprising from about 100 ppm to about 50,000 ppm water to

produce the color stable organic compound product, wherein the color stable organic compound/water mixture has an APHA color value of 15 or less after being boiled for at least one hour at one atmosphere of pressure.

15. (Previously presented) The process of claim 14 wherein the water and the organic compound are combined to produce the color stable organic compound/water mixture at a temperature of about 0°C to about 160°C.

16. (Previously presented) The process of claim 15 wherein the conditions of agitation include stirring.

17. (Previously presented) The process of claim 16 wherein the organic compound is a C_1 to C_6 carboxylic acid.

18. (Previously presented) The process of claim 17 wherein the organic compound is butyric acid.

19. (Previously presented) The process of claim 18 wherein the water and the butyric acid are combined at a temperature of about 20°C to about 50°C and the color stable organic compound/water mixture comprises from 100 ppm to about 10,000 ppm water.

20. (Previously presented) The process of claim 19 wherein the color stable organic compound/water mixture comprises from 500 ppm to about 1,000 ppm water.

IX. EVIDENCE APPENDIX

Attached is the August, 2006 *Declaration Under 37 CFR §1.132 of Kenneth Allen Windhorst.*

STATEMENT INDICATING ENTRY INTO RECORD

The August, 2006 *Declaration Under 37 CFR §1.132 of Kenneth Allen Windhorst* was entered into the record in this case on or about August 14, 2006 according to the PAIR system.

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

In Re Patent Application of:	:	
Kenneth A. Windhorst et al.	:	
U.S. Serial No. 10/635,983	:	Examiner: K.J. Puttlitz
Filed August 7, 2003	:	Group Art Unit: 1621
Docket No. C-7220 (CEL-06-7)	:	
For: PROCESS FOR PREPARING ORGANIC COMPOUNDS HAVING IMPROVED COLOR CHARACTERISTICS	:	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

DECLARATION UNDER 37 CFR §1.132

Sir:

Kenneth Allen Windhorst, co-inventor of the subject matter of the above noted patent application (sometimes referred to hereafter as the "Subject Invention"), makes the following statements in support of patentability:

1. I, Kenneth Allen Windhorst, was awarded Bachelor of Science and Master of Science degrees from Texas A&M University in Chemistry and Physical Chemistry, respectively. I have worked in the chemical industry for more than 30 years and I am familiar with processes such as oxidation,

carbonylation and the like, as well as associated features of such processes, including purification by distillation and so forth.

2. I am advised by Counsel that the claims have been rejected over United States Patent No. 3,214,347 to *Grekel et al.* and I am familiar with that patent. I further understand that the claims to the Subject Invention have been amended to recite a process for making organic compound/water mixtures to form a mixed solution having a consistent concentration of water. I am advised by Counsel that amended Claim 1 is representative:

> 1. A process for preparation of a color stable organic compound/water mixture from an organic compound selected from the group consisting of C_1 to C_6 carboxylic acids, ketones having boiling points from 154°C to 170°C, and esters having boiling points from about 168°C to about 250°C, the process comprising combining the organic compound with water under conditions of agitation to form a mixed solution of the organic compound and water having a consistent concentration of water comprising from about 100 ppm to about 50,000 ppm water to produce the color stable organic compound/water mixture, wherein the color stable organic compound/water mixture has an APHA color value of 15 or less after being boiled for at least one hour at one atmosphere of pressure.

3. *Grekel et al.* '347 does not disclose or suggest a process for making organic compound/water mixtures to form a mixed solution having a consistent concentration of water. The '347 patent is concerned with separation and uses water as a separation aid, unlike the subject invention which is not concerned with separation. In fact, the '347 patent produces "anhydrous" products, which is opposite the Subject Invention. The Subject Invention uses water to suppress unwanted, color-generating reactions. The amendments to the claims clearly exclude the '347 reference for numerous reasons. Since the reference describes organic compound/water mixtures in a distillation column, the relative concentration of the organic compound/water components will vary with height in the column, that is, will not be consistent. Furthermore,

the reference teaches production anhydrous products, not aqueous compositions. *See* Col. 2, lines 55-59, as well as Col. 7, lines 69-73; quoted below:

> The point in the column at which the make-up water is added is immaterial as long as it is not introduced at a level so low in the column that it will interfere with the production of ***substantially dry acid*** at the base of the column.
> (Col. 2, lines 55-59)

> To obtain highly purified n-butyric acid from the dry acid mixture mentioned immediately above, said mixture is fed to a third column operated at a bottoms temperature of 157.8°C. (635 mm.) and at a top tower temperature of 138.9°C (500 mm.).
> (Col. 7, lines 69-73).

I further note that the impurities that are believed to cause color do not azeotrope with water, and the process of '347 patent would be ineffective to remove them in any case. The actual production processes involved in producing butyric acid and other organic compounds typically use water and other additives in the process which are ineffective to remove color causing impurities in the finished product; which is why the Subject Invention adds water after the production is complete.

4. The Subject Invention resides, in part, in the discovery that adding water to a finished organic compound can greatly enhance APHA color characteristics. This discovery was unexpected and is very useful since superior color is achieved without expensive additional processing steps. Examples 5-7 of the above-noted application as filed are illustrative:

> Examples 5-7
> The effect of color improvement though the addition of water was determined on three samples from a commercially produced butyric acid run. The samples were prepared by successive distillations of the same portion of the commercially produced

butyric acid run. The APHA colors of the samples were determined to be as follows:

Example 5 13
Example 6 3
Example 7 1

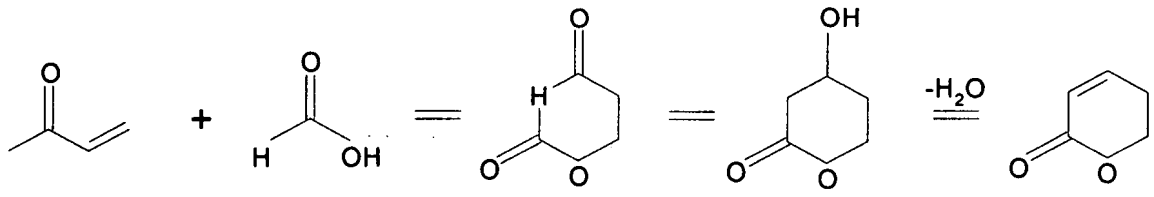
The color variance of the samples is attributable to the fact that more color bodies were present in the first distillation sample as compared to the second and third distillation samples.

To each of these samples was added 20,000 ppm, water while stirring at room temperature, to ensure uniform distribution of the water. Following addition of the water, the APHA colors of the samples were determined as follows:

Example 5 1
Example 6 1
Example 7 1

5. Without intending to be bound by theory, it is believed the invention operates, in part, as described on page 9, lines 3-11:

It is believed that a compound formed from an unsaturated ketone and a carboxylic acid in the production of the relevant organic compounds leads to formation of a Michael Adduct in accordance with the following reaction process:



Unsaturate Carboxylic acid Michael Adduct Color body

As seen from this reaction process, the Michael adduct, upon dehydration, yields color bodies thought to lead to the undesirable darker color products. It is believed that by adding water to the organic compound products, formation of the color bodies is prevented.

6. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made, are punishable by fine, or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated 8/9/06

Kenneth Allen Windhorst

Kenneth Allen Windhorst

Linda D. Hornsby

Notary X

LINDA D. HORNSBY
MY COMMISSION EXPIRES
May 15, 2010

X. RELATED PROCEEDINGS APPENDIX

There are no related appeals, interferences or judicial proceedings related to, or which will affect, or which will be affected by, or which will have a bearing on the Board's decision in this appeal.